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THE UNIVERSITY OF ALBERTA  
THE EFFECT ON MARKET PRICE OF LISTING  
COMMON STOCKS

by



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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH  
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE  
OF MASTER OF BUSINESS ADMINISTRATION

FACULTY OF BUSINESS ADMINISTRATION AND COMMERCE

EDMONTON, ALBERTA  
FALL, 1972



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THE UNIVERSITY OF ALBERTA  
FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read,  
and recommend to the Faculty of Graduate Studies for  
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Date ..... *September 15, 1972*



## ABSTRACT

Recently, an increasing number of companies are listing their common shares on the Toronto Stock Exchange. Financial managers of these companies must have felt that listing would be beneficial to the firm. One measure of the success of listing is the change in the market price of the company.

As more financial managers are facing the decision as whether to list or not, it becomes important to determine if there is a significant effect on account of listing. The purpose of this research study is to analyse the effect that listing on the Toronto Stock Exchange has on the market price of a security.

A research model was developed to aid in the study of fifty-four companies which listed in 1968 and 1969.

Myron Gordon proposed a stock evaluation model which was used to develop the research model for the study. The research model used in this study states that market price is a function of the income stream (dividend and growth in earnings), certainty attached to earnings (earnings instability, leverage and size), institutional holdings and environmental factors.

It was hypothesized that listing does have a significant systematic effect on price and two methods were used to test this hypothesis. First, regression equations



of pre-listing and post-listing evaluation of stocks were obtained to see how the shareholder evaluated various variables to determine the stock's price. Three tests were used to determine whether the stocks were evaluated in the same manner both before and after listing: (1) The F-test was used to determine if the equations were coincident; (2) the Z-test was used on the multiple coefficients of determination to determine if they had changed significantly; and (3) Fisher's test was used to determine if the individual independant variables had changed significantly.

Moreover a zero-one dummy variable was used in constructing a polled variance equation to test the effect of listing by combining both pre- and post-listing data in a regression equation. The dummy variable was in essence measuring the effect of listing. The coefficient of the dummy variable was then tested for significance.

All three tests on the pre- and post-listing equations concluded that both equations were coincident. The listing dummy variable was found to be insignificant in the regression equation. The results of these tests fail to validate the hypothesis that listing has a significant systematic effect on listing was rejected.



#### ACKNOWLEDGEMENT

No work can be completed without the aid of others' experience and ideas. This work is no exception. I wish to express my sincere gratitude to my faculty advisor Dr. Seha Tinic for his many enlightening ideas and suggestions. I would also like to thank my other committee members Dr. Chris Janssen and Dr. Tom Powrie for their suggestions.



## TABLE OF CONTENTS

Chapter	Page
1. Introduction and Current Research .....	1
Problem and Scope .....	1
Methodology .....	2
Survey of the Literature .....	3
Anna Merjos' Studies .....	3
Furst's Model .....	5
Van Horne's Study .....	10
Weaknesses of Studies .....	12
2. Stock Exchange and Over-the-Counter Market ..	16
Markets .....	16
Stock Market .....	16
Toronto Stock Exchange .....	17
Over-the-Counter Market .....	18
Trading on Exchange vs. Over-the-Counter Market .....	19
Advantages and Disadvantages of Listing ...	20
Economics of Listing .....	21
Summary .....	22
3. Stock Evaluation Model .....	25
Gordon's Research .....	25
Furst's Changes in the Model .....	31
Proposed Research Model .....	31
Hypothesis .....	35
4. Research Results .....	39
Analysis of Pre- and Post- Listing Equations	39
Pre- listing and Post- Listing Coincidence.	40
Dummy Variable - The listing effect .....	41
Does the Model explain more variance after listing? .....	41
Independant Variables .....	42
Overall Model Performance .....	43
Conclusions .....	
5. Summary and Conclusions .....	48
Major Conclusion .....	50
Pre- and Post- Listing Coincidence .....	50
Limitations of the Study .....	51
Conclusions .....	52



Chapter	Page
BIBLIOGRAPHY .....	54
APPENDIX A .....	56



## CHAPTER 1

### INTRODUCTION AND CURRENT RESEARCH

#### Problem and Scope

In 1968 and 1969, approximately 130 companies moved the trading of their common stocks from the over-the-counter market to the Toronto Stock Exchange. In some instances market price increased, yet in others price declined.<sup>1</sup> This change in price may be due to many factors: increased earnings, increased dividends, changing economic factors, management decisions, or listing itself.

In the last few years, research has been conducted concerning the effect of listing on price on both the New York and American stock exchanges.<sup>2</sup> Until this time there had been only vague generalizations on the subject.

Recently, increasing numbers of companies have been listing on the Toronto Stock Exchange.<sup>3</sup> It seems reasonable to assume that the financial managers of the companies felt that listing would be beneficial. The measure of the success of listing is the change in the market price of the company apart from the change if not listed.<sup>4</sup>

As more financial managers are facing the decision as whether to list or not, it becomes important to determine if there is a significant change in market price on account of listing. The purpose of this study is to analyse the effect that listing on the Toronto Stock Exchange can be expected to have on the market price of a security.



In this study both market conditions and the "other" variables are considered in an attempt to improve on earlier studies. Also the Toronto Stock Exchange is studied to determine if the effect of listing is different from that of the two American exchanges, NYSE and ASE.

In Chapter II the concept of listing in Canada is discussed. The over-the-counter market and the Toronto Stock Exchange are compared and contrasted and the advantages and disadvantages of listing are discussed.

In Chapter III, a theoretical development of the research model used in this paper is presented and in Chapter IV the results of the empirical study using this research model on the T.S.E. are reported. Chapter V summarizes the study and sets forth its conclusions.

### Methodology

In order to test the research hypothesis, 54 out of a total of 139 newly listed stocks in 1968 and 1969 were studied. Dividends, earnings, earnings per share, and equity for these stocks were obtained from issues of the Financial Post's Survey of Industrials, and Survey of Oils. In some cases it was not possible to obtain data for both pre- and post-listing dates; thus the possible sample was reduced from the original 139 companies to 54 companies.

Price quotations for the stocks were obtained from old issues of the Toronto Globe and Mail. Obtaining pre-listing price quotations for unlisted stocks proved to be



impossible in many cases. The Investment Dealers Association of Canada did not begin to keep statistics concerning price transactions of unlisted stocks traded in Canada until April of 1971. As a result, the only records which could be found were daily unlisted quotes of some stocks reported in the Globe and Mail. Thus in many cases it was necessary to reduce the sample of companies because of a lack of pre-list prices. Nevertheless sufficient information did exist for 54 stocks.<sup>5</sup> Of the 54 stocks, 51 are industrial stocks and 3 are oil stocks. A list of the stocks is presented in appendix A.

Because insufficient data made it necessary to limit the sample, there may be some bias in it. Unfortunately we are left in the position of inferring the size of the bias, without substantiating data.

A regression model was developed and regression analysis was applied to the stocks with the use of the IBM 360 at the University of Alberta.

#### Survey of the Literature

##### Anna Merjos Studies

Anna Merjos, in a series of articles published in Barrons, concludes that listing has a direct positive effect on the price of a stock.<sup>6</sup> In her initial survey she studied 94 issues by comparing their prices three months before, one day after, and a month following listing on the New York Stock Exchange.



Of the 94 issues, 68 outperformed the market in the three months leading up to listing; however, 43 lost part of their gains in the one month period immediately after listing. By contrast, 5 issues out-performed the market only after listing. From this study she concluded that "anticipation of listing is more favorable than the act itself."

Unfortunately, Merjos neglected to consider variables other than listing which influence market price, and thus fails to isolate the effect of listing. Factors such as increased earnings, changing dividends or management decisions, may have affected market price yet were ignored.

In a later article, she states that "listing adds, sometimes appreciably" to the market value of the stock.<sup>8</sup> In this study, 25 companies listed in the first five months of 1963 were studied. Eighteen companies outperformed the "market averages" in the 3 months period before listing, and all but one increased over the 4 month period studied. From this she concluded that listing causes a permanent increase in price as prices did not fall back to their previous levels.

Finally, in an article in 1967, she concluded that "generally speaking, listing on the New York Stock Exchange or American Stock Exchange, with its promise of wider marketability and greater prestige, pays off in the form of higher market prices."<sup>9</sup>



In her studies, market prices of newly listed stocks three months before listing were compared with market prices one day after and thirty days after listing. She then compared these changes in price with the changes in the typical market averages.<sup>10</sup>

Richard Furst attempted to improve on Anna Merjos' study by using a multiple regression valuation model to take into consideration the changes in "other" variables which occurred between the pre- and post- listing dates, and then studied the additional impact of listing.

#### Furst's Model

In his study Furst makes use of a multiple regression model developed by Myron Gordon.<sup>11</sup> His model states that the price is a function of the income stream (the dividend rate and the growth in that dividend) and the capitalization rate (influenced by leverage, size, and instability of earnings). His model in logarithmic form is<sup>12</sup>

$$\begin{aligned}\log P = & \log a_0 + a_1 \log D + a_2 \log (1 + br) \\ & - a_3 \log (1 + x/A) - a_4 \log (1 + h - ih/k) \\ & + a_5 \log S\end{aligned}$$

where  $a_0$  = the regression constant. The variables are defined as follows:

1. P. -- closing market price as of a specific date. If the stock was listed from March 1 to October 30 of any year then the prelisting price was the closing price on the last day of trading of the preceding year, and the post-listing price was the closing price on the last day of



trading in the year of listing. If the stock was listed in the first sixty days of the year, the prelisting price was the closing price on the last day of trading of the year two years previous and post-listing price was the closing price on the last day of trading in the year the stock was listed. If the stock was listed in the last sixty days of the year, prelisting price was the closing price on the last day of trading in the previous year and post listing price was the closing price of the year after listing.

2.  $D$  - dividend per share paid during the year. If no dividends were declared, \$.20 was used as the value.<sup>13</sup>

3.  $br$  = average growth rate.

The average growth rate was obtained by the following method:

Let  $y_t$  = actual earnings in year  $t$

$D_t$  = actual dividend in year  $t$

$w_t$  = actual book value in year  $t$

$b'_t$  = retention rate defined as  $(y_t - D_t) / y_t$

$r'_t$  = return on common equity defined as  $y_t / w_t$

$b'_t r'_t$  = actual growth rate

$b'_t r'_t = (y_t - D_t) / y_t \times y_t / w_{t-1} =$

$(y_t - D_t) / w_{t-1}$



To allow for the possibility of an investor viewing an unusually good year with skepticism a smoothed growth rate was used

$$br = .3b' r'_{t-t} + .7br_{t-1}$$

This differed a little from Gordon's model in that Gordon smoothed only income.

4.  $1 + x / A$  = earnings instability index.

The earnings in year  $t$  expected at the end of year  $t-1$  was defined as  $Y^*_t = Y_{t-1} (1 + br_{t-1})$

The difference between actual and expected earnings  $Y^*_t - Y_t = x$  The expression  $x / A$  (where  $A$  = total assets per share) is an approximation of earnings instability. By adding 1, an index number is obtained. This is a little different from Gordon's model as it does not use smoothed earnings other than for year  $t-1$ . Gordon used the average growth rate times the smoothed adjusted earnings to get the expected earnings value. He thus smoothed the instability index the same as the growth rate. Gordon used an average instability index whereas Furst used an actual instability index for that year. Furst has simplified the variable losing very little information.



5.  $l + h - ih / k =$  the leverage variable

$$h = \frac{\text{Long term debt} + \text{preferred stock}}{\text{common equity}}$$

i = corporate bond rate for the year

$$k = \text{cost of capital} = D \times (1 + h)^{-x_4} + br$$

$$\text{where } x = .03$$

<sup>4</sup>

(the value used by Gordon). Furst only simplifies the debt equity ratio and uses the yearly bond rate for the appropriate year rather than letting it equal .045.

6. S = corporate size, total assets minus current liabilities (the same as Gordon's model).

Furst's sample consisted of 198 companies whose common shares moved from the over-the-counter market to the New York Stock Exchange between 1960 and 1965. Pre-listing observations of variables were made for a date approximately 6 months prior to having their shares listed, and post-listing for a date approximately 6 months after having the shares listed. In order to test the effect of listing, a zero-one dummy variable was added to the valuation model. In the pre-listing data the dummy value was zero, in the post-listing it was one. All the pre- and post-list observations were then inserted in the regression model and regression coefficients and standard errors of the regression coefficients were calculated for each independent variable. Furst hypothesized that if listing is important,



the coefficient of the dummy variable should be positive and statistically different from zero.

The results obtained are summarized in Table 1.1

TABLE 1.1

REGRESSION COEFFICIENTS, STANDARD ERRORS,  
AND t-RATIOS FOR THE INDEPENDENT VARIABLES \*

<u>Variable</u>	<u>Coefficient</u>	<u>t-ratio</u>
Dividend	0.218 (0.035)	6.23
Growth rate	3.836 (0.451)	8.51
Earnings Instability	-1.125 (0.526)	-2.14
Leverage	-0.653 (0.093)	-6.99
Size	0.215 (0.026)	8.23
Listing	-0.017 (0.018)	-0.99

\*Furst, "Does Listing Increase Market Price?" pp. 178.

NOTE -- Multiple coefficient of determination = .27;  
degrees of freedom = 389; regression constant = 1.081.

From the results it is apparent that listing did not have a systematic measurable effect on the prices. The coefficient of the dummy variable is not statistically different from zero whereas the rest of the variables are highly significant. However the results were weakened in that the Multiple Coefficient of Determination was only 27%. On the basis of the results of the regression analysis, Furst concludes that "the widely-held belief that a company will benefit from listing on the NYSE through obtaining a higher market price (for its stock) was not confirmed."<sup>14</sup>



Van Horne's Study

James Van Horne also investigated the price performance of newly listed stocks.<sup>15</sup> Both Anna Merjos and Richard Furst concluded that prices tend to rise from 60 days prior to listing, and then fall back to their previous level approximately sixty days after listing. Van Horne attempted to empirically test the effect of listing on market price by computing the difference between the returns on newly listed stocks and the returns on closely related industry stocks price indices over various time periods surrounding the date of listing.<sup>16</sup>

A sample of 140 newly listed stocks from 1960 through 1967 on the NYSE and ASE was used for Van Horne's study. In order to study both pre-list and post-list price behavior, price ratios for the following time periods were calculated: 4 months before registration to 2 months before registration; 2 months before registration to registration; registration to listing; listing to 2 months after listing and 2 months before registration to 2 months after listing.

Closing stock prices were expressed as indices. If, for example, the closing market price per share for a given stock two months prior to registration was \$50, and subsequent market prices on the registration date, listing date, and two months after listing were \$60, \$70, and \$65 respectively, the price indices would be 100, 120, 140, 130 respectively. If the relevant comparison were between



the registration date and the listing date, the price indices would be 100 and 116.67 respectively. The base date employed depends on the comparison being made.<sup>17</sup>

In the initial analysis, Van Horne found that the average differences between the indices for the stocks in the sample and closely related stock price indices are positive and statistically significant during the periods prior to listing. After listing they are negative but are not significantly different from zero. The results are listed in Table 1.2.

TABLE 1.2  
RESULTS FOR LISTING STOCKS\*  
ON NYSE

	NYSE		ASE	
	Average Difference (t-ratios)		Average Difference** (t-ratios)	
4 months before to	1.69	(0.65)	5.11	(1.92)
2 months before reg- istration				
2 months before to	3.73	(2.34)	5.32	(1.93)
registration				
Registration to	5.68	(2.95)	11.95	(5.53)
listing				
Listing to 2 months	-1.88	(-1.25)	-0.63	(-0.27)
after listing				
2 months before reg- istration to 2 months	8.45	(3.04)	18.42	(3.79)
after listing				

\* Van Horne, "New Listings" pp. 789-790

\*\* For calculation of average differences see Van Horne,  
"New Listings" pp. 785-786



Van Horne qualified his results by observing several factors which detracted from his study. He noted the failure to take account of transaction costs associated with buying and selling stocks. In order to buy and sell stocks for profit, a market participant must pay transaction costs. Therefore the results in Table 1.2 do not give any indication of the profitability associated with buying and selling shares. After taking into account these costs, he revised his results and conclusions. These results are listed in Table 1.3.

In the revised data only the average difference between 2 months before registration and registration is significant at the 5% level for the NYSE sample. Here he noted that the price used for registration date was the ask price, and if the owner were to sell at registration date, the relevant price would be the bid price, in which case the average difference would not be significant. For the ASE, none of the differences were significant.

Van Horne thus concluded that his results do not support "the idea that stocks rise significantly in price after the announcement to list (registration), and continue to rise through the time of actual listing, after which they fall off."<sup>18</sup>

#### Weaknesses of Studies

Both Anna Merjos and James Van Horne neglected to consider variables other than listing which could affect market price. Both studies consider a price increase to be



TABLE 1.3

RESULTS FOR LISTING STOCKS  
ON NYSE AND ASE\*  
(Ask Prices and Actual Prices Adjusted  
for Transaction Costs)\*\*\*

	NYSE	ASE
	Average Difference (t-ratios)	Average Difference (t-ratios)
4 months to 2 months before registration	1.50 (0.57)	4.34 (1.68)
2 months before to registration	3.29 (2.08)	4.94 (1.81)
Registration to list- ing	-0.48 (-0.25)	3.32 (1.59)
Listing to 2 months after listing	-1.89 (-1.27)	0.69 (-0.30)
2 months before reg- istration to 2 months after listing	1.53 (0.60)	9.08 (1.93)

\* Van Horne, "New Listings" pp. 789-790

\*\* For calculation of average difference see Van Horne,  
"New Listings" pp. 785-786

\*\*\* To account for transaction costs, Van Horne used ask price instead of bid price for four and two months prior to registration, and for registration date. These prices were used on the supposition that the cost of purchase is approximated by ask price. For listing day and 2 months after listing actual price minus an assumed commission of one per cent was employed.

the result of listing. In reality, the company's earnings may have doubled or the stocks inherent risk may have decreased causing the increase in price. Richard Furst, however, considers these 'other' variables which affect price but does not consider overall market conditions.



## FOOTNOTES

## CHAPTER I

1. For example, market price for Na-Chur International Ltd. on March 18, 1968, one month before listing, was \$17.37. On listing day, April 17, market price was \$22.00 and two months later the price had soared to \$31.00.
2. These studies, done by Anna Merjos, Richard Furst and James Van Horne, will be discussed at length later in this chapter.
3. Sixteen listed in 1966, 23 listed in 1967, 53 listed in 1968, and 86 listed in 1969. See "Newlistings", Toronto Stock Exchange Review, 48 vols, 1966-1969.
4. All factors affecting a company have some effect on market price and thus the measure of the effect of listing is the change in the market price of the company's shares.
5. All major financial journals were studied in order to obtain necessary data. Several investment brokers in Edmonton were consulted and letters were sent to the Financial Post and the Canadian Investment Dealers Association to obtain data. Unfortunately, when the necessary information needed for the study was unavailable, the stock had to be deleted from the sample.
6. Anna Merjos published three studies:

Anna Merjos, "Going on the Big Board: Stocks Act... Better Before Listing than Right Afterward", Barrons, January 29, 1962, pp. 5-9.

Anna Merjos, "Like Money in the Bank: Big Board Listing, the Record Suggests is a Valuable Asset", Barrons, July 8, 1963, pp. 9-13.

Anna Merjos, "Going on the Big Board", Barrons, May 1, 1967, pp. 9-10.
7. Anna Merjos, "Going on the Big Board: Stocks Act Better" pp. 5-9.
8. Anna Merjos, "Like Money in the Bank" pp. 9-13.
9. Anna Merjos, "Going on the Big Board" pp. 9-10.



10. Merjos used the Dow-Jones Industrial Average as an index of overall market activity.
11. For a discussion of Gordon's Model see Myron Gordon, The Investment Financing and Valuation of the Corporation Richard D. Irwin, Inc., Homewood, Illinois, 1962.
12. Richard Furst, "Does Listing Increase Market Price of Common Stocks?" The Journal of Business, April 1970, pp. 174-180.
13. Initially \$.01 was used in order to avoid having a zero in the logarithmic equation. However, when \$.01 was used as the value, it distorted the anticipated income flow  $D \times (1 + br)$  and therefore yielded a low regression coefficient. When \$.20 was used as the value the coefficient of determination increased.
14. Furst, "Does Listing Increase Market Price?" pp. 179.
15. J. Van Horne, "New Listings and Their Price Behavior", Journal of Finance, September 1970, pp. 783-794.
16. Standards and Poor's industry averages were used as industry stock price indices. As was true with individual stock prices, industry averages were expressed in terms of indices.
17. Van Horne, "New Listings", pp. 785.
18. Van Horne, "New Listings", pp. 794.



## CHAPTER II

### THE STOCK EXCHANGE AND THE OVER-THE-COUNTER MARKET

The objective of most financial managers is to maximize market value of the business organization. From this it might be hypothesized that financial managers of newly listed companies believe that listing will increase the market value of the firm. If this is true, it is important to discuss the effect that listing should have on market price. Listing is moving the trading of a stock from the over-the-counter market to an exchange market (in this case the Toronto Stock Exchange).

#### Markets

Initially in discussing the stock market, it is important to fully understand the term "market". Many authors who discuss economic theory define the term within the context of the market process, where two parties, buyers and sellers, interchange economic goods for money. West and Tinic define the market as a set containing buyers, sellers, and transactions.<sup>1</sup>

#### Stock Market

The stock market is a meeting place for individuals wishing to sell stocks and individuals wishing to buy stocks. An individual who wishes to buy a certain stock may submit his buy order to a stock broker or dealer who will, on his behalf, attempt to complete the transaction



with a seller of the stock. The stock market simplifies the transaction compared to an individual buyer attempting to contact each individual seller in order to attempt to buy a security. At present, virtually all common stocks in Canada are traded in one of two basic types of market structures: stock exchanges and over-the-counter markets.

### Toronto Stock Exchange

A stock exchange is a highly organized market-place where stocks can be traded. Rather than individual investors going to the place where stocks are traded, they must gain access by dealing through one who has the right to be present where trading takes place. This right to be present must be bought by purchasing a "seat" on the exchange. Presently there are 113 seats on the TSE.<sup>2</sup> To facilitate the processing of orders submitted by investors, the exchanges have developed a high degree of specialization and division of labor among their members.<sup>3</sup>

A typical customer's order begins when a customer calls a member firm and notifies them of his wish to sell or buy some shares. The brokers will send this order to the floor of the TSE. A floor trader is given the order and he proceeds to the trading area at which all transactions for this stock will take place. Here he attempts to get the best possible price for his client.

The trading floor of the stock exchange is the



focal point of activities. It is on the trading floor that the forces which influence security, investment and speculation meet and, through the process of supply and demand, balance themselves in the creation of market prices.

In order for a stock to become listed on the Toronto Stock Exchange, it must meet certain standards.<sup>4</sup> In addition, having applied for and been granted listing privileges for one class or all of its issued shares a corporation becomes bound to comply with the terms of a "listing agreement" with the exchange which is executed by the company.<sup>5</sup>

For the benefit of the public, market information on price, volume, bid and offers are quoted daily by the Toronto Stock Exchange. This information is readily accessible to the public from any investment broker.

#### Over-the-Counter Market

In contrast, the outward appearance of the over-the-counter market seems disorganized. It has no trading floor, no building, no centralized location where buyers and sellers meet to engage in trading.<sup>6</sup> Rather, it is a network of brokers and institutions connected by telephone, teletype, and telex which constitutes this market.

Market information on price, volume, bids and



offers is obtained mostly by word of mouth. In Canada there is little, if any, information collected concerning trading volume or bid-ask prices. The Investment Dealers Association provides some printed information on bid-ask price in some daily newspapers but these are only approximate prices.

In comparison with market exchanges, the over-the-counter market has no requirements to be met in order for trading to proceed. It is not necessary for traded securities to meet any standards or listing requirements. It has complete freedom of access and behaviour.

#### Trading on Exchange vs. Over-the-Counter Market

It is the contention of West and Tinic that the primary determinant in the allocation process is whether or not trading can be effectively organized on a continuous auction basis.<sup>7</sup> They contend that when conditions seem amenable to a continuous auction basis, the stock usually trades on an exchange.<sup>8</sup>

On a priori grounds, it could be assumed that the primary determinant of facility of the auction basis would be the amount of issue outstanding and the characteristics of its ownership pattern. In particular, it seems reasonable that an issue with a large volume of outstanding shares held by a substantial number of small investors ought to facilitate the continuous auction basis



of trading.

Harold Demsetz supports this reasoning in reporting that for a sample of NYSE listed stocks, the time rate of transactions, defined as the number of separately recorded transactions per day, is highly correlated with the number of shareholders.<sup>9</sup> In other words, the greater the number of shareholders, the better the continuous auction system works. This is consistent with the listing requirements of major exchanges in that they demand at least a minimum amount of shares and a minimum number of shareholders.<sup>10</sup> This tends to weed out stocks which would be too thin for trading on the continuous auction basis.

On the opposite side, the over-the-counter market's real virtue lies in its emphasis on negotiation. If a stock's order flows are too thin to be effectively handled on the continuous auction basis the over-the-counter market offers brokers the alternative of actively seeking a market for the stock.

#### Advantages and Disadvantages of Listing

The primary advantage of a stock exchange is marketability or liquidity of services. A listed security can be more readily acquired or sold at any given time by the investor, under well-defined rules and conditions governed by the exchange.<sup>11</sup> This liquidity gives listed



securities a distinct advantage over many other types of investment media.<sup>12</sup>

A further advantage is company prestige and goodwill. A listed company must have attained high standards in regulating its financial and corporate standing, and thereby derives a certain prestige. The listing of shares demonstrates the company's goodwill and its agreement to supply information concerning its affairs to the Exchange and to the public. The investor in listed securities is able to obtain reasonably complete and recent information from the exchange at any time.

A listed stock also obtains increased attention of investors.<sup>13</sup> Daily publication of trading in the stock and the announcements of changes in the company keeps investors informed and obtains a certain amount of publicity and advertising for the company.

Even with the advantages discussed above, not all securities in Canada are listed on one of the major exchanges. Some companies do not wish to abide by the restrictions with respect to options, reporting of dividends, etc. which the exchange requires.<sup>14</sup>

### Economics of Listing

The value that investors place on increased liquidity and the additional information which they receive from a listed stock should be reflected through an



increased price. Thus if the price of a stock does increase, assuming all factors other than listing remain constant, its change in price accrues to the value investors set on this additional information. Therefore if price does not change significantly, it can be concluded that our empirical findings fail to support the hypothesis that investors place a value on the additional advantages which they receive from listing.

### Summary

The studies conducted by Anna Merjos support the traditional viewpoint concerning the advantages of listing as discussed previously. Both Furst and Van Horne studies, however, refute this hypothesis.

In the next chapter a theoretical model will be developed to test the effect of listing on the Toronto Stock Exchange.



## FOOTNOTES

## CHAPTER II

1. R. West and S. Tinic, The Economics of the Stock Market (New York: Praeger Publishers, 1971), p. 18.
2. The Canadian Securities Course, (Toronto, Ontario, 1968) p. 22
3. For a discussion of this specialization in the New York Stock Exchange see Richard West and Seha Tinic, The Economics of the Stock Market. The only difference in Canada is that Canada has no specialists or odd lot dealers. Also each member firm is allowed 5 floor traders.
4. For various listing requirements see The Canadian Securities Course, p. 229-231.
5. The Canadian Securities Course, p. 232.
6. West and Tinic. p. 54.
7. West and Tinic. p. 54.
8. Although this is usually the case, it is not always so as stocks have other requirements to be fulfilled before listing can take place. In addition, some companies do not want to list even though they may meet the requirements.
9. Harold Demetz, "The Cost of Transacting," Quarterly Journal of Economics, 82 (February, 1969), p. 47.
10. Listing requirements for industrial, investment, and real estate companies on the Toronto Stock Exchange are as follows: (a) With a record of earnings: Minimum net tangible assets of \$750,000. Net working capital adequate to carry on the business. A minimum of \$50,000 earnings after taxes in the last 5 years. (b) With no records of earnings: Minimum net tangible assets of \$1,000,000. Net working capital adequate to carry on the business. A satisfactory over-the-counter market experience for a period of at least one year unless the company is a substantial existing and successful enterprise which can provide satisfactory evidence of profitability. (c) Public Distribution: A minimum of 20% of the issued shares held by at least 200 public shareholders



each holding a board lot or more. (d) Market value of issued shares in the hands of the public must total a minimum of \$250,000. (e) Management and sponsorship of an applicant company is an important factor in determining whether or not a listing is granted. (f) Exceptional circumstances can occur, and such applications are considered on their own merits. See Canadian Securities Course, p. 229-231.

11. A listed security can be more readily acquired by the investor follows from the auction basis providing increased liquidity.
12. The Canadian Securities Course, p. 227.
13. The Canadian Securities Course, p. 228.
14. The Canadian Securities Course, p. 228.



### CHAPTER III

#### STOCK EVALUATION MODEL

In developing a model to test the effect of listing on the TSE, Gordon's model was closely followed. Gordon's model attempts first to define and measure the income flow and then identify and measure those variables that influence the capitalization rate that will be applied to the income flow.

#### Gordon's Research

Gordon's earliest empirical work was done to establish whether investors used dividends or earnings in the valuation of a stock.<sup>1</sup> The hypothesis that investors use earnings alone or that they use both earnings and dividends was tested with the aid of the linear function

$$P = a_0 + a_1 D + a_2 Y$$

where P is the year-end price, D is the dividend declared during the year, and Y is the earnings during the year. Eight samples were tested and the results of the least-squares estimates of the parameters, their standard errors, and the sample coefficients of determination are presented in Table 3.1.

It is evident that investors look at both variables. However the high intercorrelation between the two independent variables makes the coefficients highly unstable.<sup>2</sup>



Gordon then used a simple model to test whether an investor buys dividends. The model used was

$$P = a_0 + a_1 D + a_2 (Y-D)$$

He reasoned that investors buy dividends but the price they are willing to pay varies with the stocks expected rate of growth, which is a function of retained earnings ( $Y-D$ ).<sup>3</sup> Table 3.2 presents the results for this model.

TABLE 3.1  
REGRESSION OF PRICE ON DIVIDEND AND INCOME\*

	Chemical	Food	Steel	Machine Tool
1951				
Constant term	-7.0	.1	5.5	2.4
Dividend				
Coeff.	-.8	7.0	6.6	12.0
S.E.	(5.2)	(1.5)	(1.8)	(1.2)
Earnings				
Coeff.	16.7	5.5	2.0	.8
S.E.	(3.1)	(.9)	(.6)	(.5)
Coeff. of Det., $R^2$	.865	.810	.740	.810
1954				
Constant term	-3.0	-.4	8.7	6.3
Dividend				
Coeff.	25.7	10.4	8.4	5.5
S.E.	(5.2)	(2.2)	(1.7)	(1.4)
Earnings				
Coeff.	.3	5.6	2.0	4.1
S.E.	(3.3)	(1.0)	(.8)	(.6)
Coeff. of Det. $R^2$	.846	.828	.884	.792

\* Gordon, The Investment, Financing and Valuation of the Corp., p. 143



From the results, we can see that both the range of variation in the dividend coefficient and its standard error are materially reduced. From this Gordon concludes that "price varies with dividends given retained earnings" is a better statement than "price varies with dividend given earnings."<sup>4</sup>

It was disappointing that the growth (retained earnings) coefficient varied widely and in some cases was not statistically significant. While the second model is an improvement on the first, Gordon recognized that it was necessary to refine the measurement of the growth variable.

The refined model employed was<sup>5</sup>

$$P = a_0 D^{a_1} (1 + br)^{a_2} S^{a_3} (1 + u)^{a_4}$$

In order to improve the estimates of the current dividend and its expected growth rate, he used the exponentially weighted averages of dividends and earnings. For the smoothing constants, Gordon selected .6 and .5 for dividend and earnings, respectively.<sup>6</sup> Thus dividends and earnings were defined

$$D_t = .6D_{t-1} + (1-.6) D_{t-1}$$

$$Y_t = .5Y_{t-1} + (1-.5) Y_{t-1}$$

The expected rate of growth in the dividend is

$$b_t r_t = (Y_t - D_t)/W_t \text{ where } W_t \text{ is net worth.}$$



TABLE 3.2

## REGRESSION OF PRICES ON DIVIDEND AND RETAINED EARNINGS\*

	Chemical	Food	Steel	Machine Tools
		1951		
Constant term	-7.0	.1	5.5	2.4
Dividend				
Coeff.	15.9	12.5	8.6	12.8
S.E.	(2.7)	(1.1)	(1.5)	(1.0)
Retained Earnings				
Coeff.	16.7	5.5	2.0	.8
S.E.	(3.1)	(.9)	(.6)	(.5)
Coeff. of Det., $R^2$	.865	.81	.74	.81
		1954		
Constant term	-3.0	-.4	8.7	6.3
Dividend				
Coeff.	26.0	16.0	10.4	9.6
S.E.	(2.6)	(1.5)	(1.4)	(1.2)
Retained Earnings				
Coeff.	.3	5.6	2.0	4.1
S.E.	(3.3)	(1.0)	(.8)	(.6)
Coeff. of Det., $R^2$	.846	.828	.884	.792

\* Gordon, The Investment, Financing and Valuation of the Corp., p. 143

The remaining variables were defined as follows

b = current retention rate;  $(Y-D)/Y$

S = size; net working capital + net plant account

U = instability of corporation's earnings; average of the year to year change in income (without regard to sign) over the period 1947 to the sample year divided by book value per share.

In this model, variability of earnings is entered into the model for the first time. It allows for no trend



in earnings, but Gordon corrects this later. It is hypothesized that the greater the uncertainty of earnings, the lower the price will be for a given level of earnings.

It also seems logical that all other factors being the same, size is important in the valuation of the firm. The larger the corporation, the better it will be able to absorb any earning fluctuations caused by changes in economic conditions or other random factors.<sup>7</sup>

At this time Gordon ignored the leverage variable. The results in using the debt-equity ratio were poor so the leverage variable was dropped. In later models, Gordon made use of a more sophisticated treatment of leverage.

The use of this model in logarithmic form gave favorable results. The  $R^2$  value was between .80 and .93 and the estimates of the coefficients of almost all variables with the possible exception of size are highly significant in all cases. The results are reported in Table 3.3.

The dividend coefficients remain significantly below one, but all are above .82 and their average is closer to one.<sup>8</sup> The growth coefficients are now all statistically significant at the 1% level or better. All of the earnings instability and size coefficients have the right sign. Six of the eight size coefficients and five of eight uncertainty coefficients are statistically significant at the 5% level or better.



TABLE 3.3.

 REGRESSION OF PRICE ON EXPONENTIALLY AVERAGED DIVIDEND  
 AND GROWTH RATE AND ON RISK VARIABLES\*  
 COEFFICIENT AND STANDARD ERROR

	lna	lnD	ln(1+br) Food Sample	Ln(1+u)	lnS	R <sup>2</sup>
1954	2.55 (.15)	.83 (.06)	11.80 (1.49)	-5.49 (1.31)	.071 (.036)	.904
1955	2.56 (.13)	.93 (.05)	9.87 (1.29)	-4.23 (1.23)	.055 (.032)	.931
1956	2.62 (.14)	.92 (.05)	8.76 (1.34)	-4.44 (1.35)	.027 (.032)	.912
1957	2.49 (.12)	.83 (.05)	9.87 (1.25)	-6.21 (1.20)	.065 (.026)	.931
Machinery Sample						
1954	2.42 (.22)	.88 (.09)	4.16 (1.32)	-1.97 (1.61)	.122 (.045)	.799
1955	2.47 (.19)	.83 (.07)	6.07 (1.39)	-2.32 (1.48)	.093 (.039)	.869
1956	2.41 (.17)	.82 (.05)	7.68 (1.12)	-1.77 (1.40)	.116 (.034)	.912
1957	2.23 (.17)	.85 (.05)	3.91 (1.25)	-4.52 (1.60)	.149 (.033)	.893

\* Gordon, The Investment, Financing and Valuation of a Corp., p. 151

In the final step, Gordon made only minor changes to his model. Measurement of dividends was changed to the actual dividend for the year as in many cases if earnings varied slightly, dividends remained constant. The growth variable was redefined slightly by applying different weights to past and present earnings.<sup>9</sup> The earnings instability variable was altered to include trend and a leverage variable



was added.

In final form, Gordon's model states that market price of a stock is a function of its income stream (dividend plus rate of growth in dividend) and a function of the certainty attached to income (earnings instability, leverage, and size). In logarithmic form the regression model is

$$\ln P = \ln \hat{a}_0 + a_1 \ln D + a_2 \ln (1 + br) \\ - a_3 \ln (1 + x/A) - a_4 \ln (1 + h - ih/K) - a_5 \ln S$$

where  $a_0 = 1/a_0$

and  $1 + x/A$  = earnings instability index

$1 + h - ih/K$  = leverage variable

D = dividend

br = growth rate

S = corporate size

#### Furst's Changes in the Model

Furst's model differed from Gordon's only in the definition of the variables and not in the variables themselves. These changes were discussed in Chapter I when discussing Furst's model.

#### Present Research Model

The research model of this paper uses essentially the same variables as Gordon. The major differences are that a linear model was used, some of the variables were calculated differently, and a new institutional variable was added.<sup>10</sup> The model states that market price is a function of the income stream (dividend and growth in



earnings), certainty attached to earnings (earnings instability, leverage, and size,), institutional holdings and overall economic and market conditions. In equation form

$$P = a_0 + a_1 D + a_2 G + a_3 EI + a_4 (1 + h) \\ + a_5 S + a_6 I_{ns}$$

The variables are defined as follows:

(1) P = Price; Furst's study neglected taking overall market factors into account when studying the effect of listing. If the price had risen because of good overall market conditions, the model would be unable to account for it. Thus a price index was set up. For the pre-listing price index, the price of the stock was divided by the Toronto Industrial Index for 21 trading days prior to listing and the average was taken.

$$\text{Price Index} = \sum_{i=1}^{21} (P_i / TII_i) / 21$$

For post-listing price 41 trading days after listing were used.

$$\text{Price Index} = \sum_{i=1}^{41} (P_i / TII_i) / 41$$

Twenty-one trading days (or approximately one month) was arbitrary chosen in order to obtain an average price index rather than taking a price one month previous to listing in order to calculate our price index. By averaging price over a time period, variability in prices



may be eliminated. Forty-two trading days (or 2 months) was also arbitrarily chosen. Two months were chosen rather than one in order to use a longer period of time to obtain price.

All but 3 stocks in the sample were industrial stocks so the Toronto Industrial Index was used to construct the price index. The Toronto Industrial Index is an index of overall market movement of industrial stocks, and overall environment factors affecting the stock market should affect the TII. Thus by using it to construct a price index, it is believed that environmental factors affecting stocks will be, in effect, held constant.

(2) D = Dividend per share.

(3) G = Earnings per share growth. A growth variable was calculated by developing a growth trend variable.

Earnings per share were calculated for 4 years up to listing and a regression equation was calculated for each company.

$$\text{EPS} = a + bY \text{ where EPS} = \text{earnings per share}$$
$$\text{and } Y = \text{the year.}$$

The equation was regressed over 4 years and a and b were estimated. Then, b was used as the growth variable;  $b = G$ .

(4) EI = Earnings Instability. An earnings instability variable was calculated from an earnings growth trend equation.



$$E = a + bY \text{ where } E = \text{earnings}$$

$$Y = \text{year.}$$

The equation was regressed over 4 years and the earnings instability variable (relative variance) was calculated by

$$EI = \frac{\sigma^2 \text{ of earnings regression}}{(\text{average earnings})^2}$$

- (5)  $l + h$  = leverage variable where  $h = \frac{\text{long-term debt}}{\text{common equity}}$
- (6)  $S$  = size defined as logarithm of the number of shares outstanding. It seems logical that the larger the number of shares outstanding the better the trading of the stock can be effectively run in an auction basis. This is supported by the discussion in Chapter II where from a study done by Demsetz it was concluded that the greater the number of shareholders the better the continuous auction system works. Thus the larger the number of shares the better the trading can effectively take place on the exchange. It also seems logical that once a certain size (or number of shares) has been reached further change in size would have a negligible effect on price of the shares. Therefore the logarithm of the number of shares outstanding was used for the size variable.<sup>11</sup>
- (7)  $Ins$  = average number of shares held by institutional holders. Institutional investors, because they trade large blocks of shares relative to the average tend to



reduce the stock exchange's self-equating properties.<sup>12</sup>

When the inflow of orders is unbalanced, as can be the case when large blocks are offered on the market, a 'lumpy' market occurs. It is difficult for these blocks to be readily absorbed through the market and the liquidity of the market is lowered, and other factors being equal, the lower the price will be.

### Hypotheses

From Gordon's research it is hypothesized that dividends and growth variables will have a positive influence on price and thus have a positive coefficient. Similarly, the instability index variable will have a negative influence on price and a negative coefficient in the model.

The leverage variable may be evaluated in two different ways. The traditional approach to valuation and leverage assumes that there is an optimum capital structure and that can be increased through the judicious use of leverage. The traditional approach implies that the optimum structure occurs where the marginal real cost of debt equals the marginal real cost of equity.<sup>13</sup> A different argument is provided by Modigliani-Miller.<sup>14</sup> They argue that the total risk for all security holders of a firm is not altered by changes in its capital structure. The crucial support for this hypothesis is the presence of arbitrage in capital markets.<sup>15</sup> Thus arbitragers are able to substitute personal leverage for corporate leverage driving the value of the levered firm equal to the



value of the unlevered firm. Thus the total value of the firm (and the market price) must be the same regardless of its financing mix. From Gordon's research, it is hypothesized that Modigliani-Miller's position will be supported and leverage will have an insignificant effect on price.

The larger the number of shares the more effective is the continuous auction system. If the auction system is more effective the higher the price should be. Thus it is hypothesized that size will have a positive influence on price and thus a positive coefficient.

Because the institutional variable is defined as the average number of shares held by an institutional investor it is anticipated that it will have a negative effect on price. The greater institutional investing the lower the liquidity of the market and thus the lower the price.

Finally it is hypothesized that the listing variable will be significant, indicating that listing does have a significant effect on price.



## FOOTNOTES

## CHAPTER III

1. Myron Gordon, "Dividends, Earnings, and Stock Prices," Review of Economics and Statistics, 41 (May, 1959), pp. 99-105
2. Myron Gordon, The Investment, Financing and Valuation of the Corporation, Richard D Irwin Inc., Homewood, Ill. 1962, pp. 142.
3. Retained earnings,  $Y - D$ , is an index of the expected rate of growth, since it will vary with the fraction of income a corporation retains other things being equal. Gordon, The Investment of the Corp., p. 142.
4. Myron Gordon, The Investment of the Corp., p. 143.
5. Myron Gordon, "The Savings, Investment, and Valuation of a Corp.," Review of Economics and Statistics, (Feb., 1962). pp. 37-51.
6. To determine the smoothing constants Gordon tested various sets of weights. The selection of smoothing constants. .6 and .5 for dividend and earnings, respectively, was based on the fact that this set of weights yielded the highest multiple in all Gordon's sample. Gordon, "The Savings of the Corp." p. 51.
7. Myron Gordon, The Investment of the Corp., p. 146.
8. Since  $a_1$  is the dividend multiplier,  $a_1 = 1$  is predicted by the theory. Gordon, The Investment of the Corp., p. 147
9. The smoothed earnings in each year were obtained by
$$Y_t = .3Y_{t-1} + .7Y_{t-2}$$

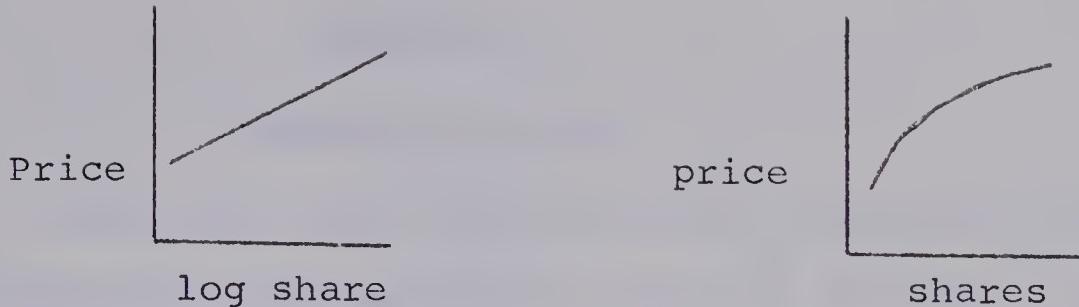
The trend of growth in earnings was arbitrarily set at .03 for 1946, and for each subsequent year it was obtained from the expression

$$G_t = .3(Y_t - Y_{t-1}) / Y_{t-1} + .7G_{t-1}$$

The smoothed trend adjusted earnings is

$$Y_t = .3Y_{t-1} + .7Y_{t-2} (1 + G_t)$$
10. In testing our sample with Gordon's model, the results proved very poor. Thus a linear model was tested and variables were calculated differently greatly improving the results.
11. It is hypothesized that price is a linear function of the logarithm of outstanding shares whereas it is not a linear function of shares.





12. West and Tinic, p. 146
13. J. Van Horne, Financial Management and Policy (Englewood Cliffs, N.J.: Prentice - Hall Inc., 1968), p. 153.
14. Modigliani and Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment", American Economic Review, June 1958.
15. The assumptions upon which their hypothesis is based are listed in Modigliani and Miller, "The Cost of Capital".



## CHAPTER IV

### RESEARCH RESULTS

Initially, the coefficients of the model presented in Chapter III were estimated with pre- and post-listing data for all companies as a group. Then a zero-one dummy variable was added to the equation and all pre- and post-listing data were combined and regression analysis performed. For all pre-listing data, a zero value was assigned to the dummy variable, and to all post-listing data a one value was assigned to the dummy variable. The results of the regression are listed in Table 4.1.

#### Analysis of Pre- and Post-Listing Equations

With the possible exception of the size variable coefficient, all coefficients increased in size after listing. There may be two important ways in which pre- and postlisting equations could differ.

First, listing may have an effect. Because of listing, shareholders may value the stock differently, thus raising the value of the coefficients of the dependent variables.

Second, if the  $R^2$  value was greater in the listing period, the model may be a better predictor after listing. If the change in the coefficient of determination is significant it may be possible to say that the model explains more of the variance after listing than before listing.



TABLE 4.1  
Regression Coefficients and t-ratios\*

	Before	After	Combined
Intercept	-15402	-.60	-.1001
Dividend	.00135 (4.23)	.00140 (4.46)	.00138 (6.44)
Growth	137.239 (2.96)	192.639 (2.95)	151.880 (4.254)
Instability Index**	-1674364 (-0.4709)	-2685385 (.1145)	-1814064 (-.5380)
Size	.01445 (1.886)	.00717 (.8265)	.01034 (1.817)
Institution Index	-.00001 (-0.3642)	-.00001 (-.0364)	-.00001 (-.29916)
Leverage	-.00004 (0.02355)	.00041 (.09957)	.00001 (.0777)
Dummy Listing Variable			.00225 (.2312)
Coeff. of determination	.409	.461	.429
Standard Error of Est.	.051	.051	.050
Degrees of freedom	53	53	107
Overall F	5.420	6.704	10.730

\* The regression was performed with the use of a Fortran program written at the University of Alberta.

\*\* The reason for the very large coefficient for the instability index was because when calculating the variable its value was very low; in most cases in the .00001 to .000001 range.

#### Pre-Listing and Post-listing Coincidence

Initially it is important to determine if pre-listing and post-listing equations are coincident. In other words, if the independent variables are assigned the same values, will the dependent variable be the same? If this is true, listing had no significant effect on the valuation of a stock.<sup>1</sup>

In order to determine the coincidence of the equations the F test was used. The calculated F value for the test of coincidence was 0.0048. For 7 and 108 degrees of freedom for the numerator and denominator, respectively,



the required significance value at the 5% confidence interval was 2.09. Therefore, the equations were highly coincident indicating that listing did not seem to have any effect on the market price.

#### Dummy Variable - The Listing Effect

As stated earlier in order to test for the effect of listing, a dummy variable was added to the valuation model. If listing did have an effect on the price of the stock, the coefficient of the dummy variable should be positive and significant.

When all pre- and post- listing observations were regressed, the coefficients of the listing variable was .00225. Applying the t-test to determine significance, the t value was .2312. As this is lower than the value of 1.96 needed for significance at the 5% level, the results obtained in the test for coincidence indicate that listing per se has no statistically significant effect on market price.

It may be erroneous to draw strong conclusions based on the 0-1 dummy variable test since it is difficult to determine whether or not this variable reflects only the effects of listings. Consequently, it is important to reinforce the results of using a dummy variable by using the Z test on the coefficient of determinations and Fisher's test on independent variables.

#### Does the model explain more variance after listing?

As was noted previously the coefficient of deter-



mination improved when post-listing data (.461) was compared with pre-listing data (.409). This indicates that the model explained more of the variance in the market price after the stock was listed on the T.S.E. than when the stock was traded over-the-counter.

To test whether two sample values of  $R^2$  are drawn from the same population, the significance between the difference can be tested by converting them to z values.<sup>2</sup> Table 4.2 shows the results of testing.

TABLE 4.2

## Results of Z-test

r	z	n	$1/n-3$	t-value
.679	.828	54	.0196	
.639	<u>.757</u>	54	<u>.0196</u>	
	.071	:	$\sqrt{.0392}$	.359

From this it can be concluded that the z's are from the same population, and hence that the R's are from the same population. Thus it is not possible to say that the model is a better predictor after listing than before listing. The results reinforce the conclusion that listing had no significant effect on the price of the stock.

Independent Variables

Pre- and post- listing equations were tested for coincidence to determine if pre- and post- listing coefficients were significantly different.

It may also be of importance to test all variables



individually to determine where changes occurred if the regressions were not found to be coincident.

Lawrence Fisher proposed a test to determine the significance of the differences of the regression coefficients.<sup>3</sup> The results are shown in Table 4.4.

TABLE 4.4.

Results of test for regression coefficients coincidence

Variable	Y	Level of Rejection ( $\alpha=5\%$ )
Dividend	.013	3.84
Growth	.4834	3.84
Size	.3566	3.84
Leverage	.0018	3.84

\* It was impossible to obtain a value for the institutional index as the standard errors were not known because the computer only calculated them to 5 decimal places.

The results indicate that all coefficients are coincident. This further reinforces the conclusion that pre- and post-listing equations come from the same population and thus indirectly that listing had no significant effect.

#### Overall Model Performance

Some generalizations concerning the overall performance of the model are appropriate.

First, despite the limitations, the model performed relatively well. The dividend and growth variables are always significant at the 1% level and have the correct



positive sign. The instability index, size, and institutional index, although not significant, always have the correct sign. The leverage variable is always insignificant. (Table 4.1)

Second, the multiple coefficient of determination, although somewhat higher than in Furst's study ( $R^2=.27$ ), was still significantly lower than in Gordon's study ( $R^2=.82$ ). The multiple coefficient of determination of the pre-listing data was .409, for post-listing data (.461) and for the overall regression (.429). The low coefficient may be explained by the wide variety of companies in the sample. The companies were from many different industries which may be evaluated in a different manner and thus the variables in the model may have different importance to shareholders. In contrast, Gordon's sample was extremely homogeneous, having been taken from one industry. The lack of homogeneity explains the low coefficient of determination to a degree.

Third, the simple correlation coefficients indicate little difference between before listing prices and after listing prices. These coefficients are listed in Table 4.3. With the exception of only two coefficients, all are higher after listing than before. Even the price dividend correlation coefficient is higher indicating what, after listing, shareholders still consider dividends to be very important.



TABLE 4.3  
 Simple correlation coefficients  
 Both pre- and post- listing  
 Price Dividend Growth Size Instab. Leverage

Dividend	.555					
Growth	.312	.006	-.248			
Size	.206	.245	-.140			
Instability	.131	-.34	-.115	-.195		
Leverage	.042	.073	-.066	.140	-.040	
Institutions	-.072	-.061	-.153	.220	-.007	.017

Before

Dividend	.517					
Growth	.276	-.054				
Size	.207	.205	-.314			
Instability	-.164	-.037	-.119	-.223		
Leverage	.023	.040	-.085	.158	-.051	
Institutions	-.068	-.056	-.141	.233	-.023	-.002

After

Dividend	.588					
Growth	.379	.093				
Size	.205	.293	-.160			
Instability	-.154	-.060	-.287	-.336		
Leverage	-.118	.217	-.072	.184	-.044	
Institutions	-.076	-.065	-.175	.208	.072	.075

Conclusions

From the results of this sample of stocks it can be concluded that listing per se does not have a significant measurable effect on a stock's price. Four tests were used to support this conclusion: the zero-one dummy variable was found insignificant; the F test for coincidence found the pre- and post-listing equations coincident; the Z test on coefficients of determination concluded that the equations came from the same population, and the independent coefficients of the variables of the regression were found to be coincident.



## FOOTNOTES

## CHAPTER IV

1. If the equations are coincident, then the error sum of squares for the overall regression resulting from the combination of the pre- and post- listing equations should have been equal to the sum of the error sums of squares for the separate equations. The difference between the error sums of squares thus became a measure of the degree of coincidence. If the equations did not give the same value for the dependent variable (ie. they are not coincident) it could be concluded that listing had an effect on the market prices of the common stocks. If we let  $E$  designate the error sum of squares for the combination of equations, and  $E_0$  the sum of the error sum of squares for two separate equations, then it can be shown that  $(E_1 - E_0) / \sigma^2$  and  $E_0 / \sigma^2$  have independent  $\chi^2$  distributions with  $P + 1$  and  $n + N^* - 2p - 2$  degrees of freedom, respectively. The hypothesis could thus be tested by an F-distribution test where

$$F = [(E_1 - E_0) / (p + 1)] / [E_0 / (n + N^* - 2p - 2)]$$

where  $n$  and  $N^*$  are equal to the number of observations in each equation and  $P$  was equal to the number of independent variables. See K. W. Smillie, An Introduction to Regression and Corelation (New York: Academic Press, 1966) pp. 72-73

2. In order to do this, calculate the ratio of the difference of the Z value (.071) to the standard error of this difference (.0392). See Snedecor & Cochran Statistical Methods, (Ames, Iowa, Iowa State: University Press) 1967, p. 186.
3. An approximate test of the significance of the differences of the partial regression coefficients among the cross-sections is provided by the following: Suppose that the estimated partial regression coefficients,  $b_{it}$ , from the separate samples  $t = 1, T$  are all estimates from the same population. Let  $s_{it}$  be the standard error of estimate of  $b_{it}$

$$b_i^* = \frac{\sum_{t=1}^T b_{it} / s_{it}^2}{\sum_{t=1}^T 1 / s_{it}^2}$$



Then the statistic

$$y = \sum_{t=1}^T (b_{it} - b_i^*)^2 / s_{it}^2$$

has approximately the  $\chi^2$  distribution with  $T-1$  degrees of freedom. Hence an improbable high value of  $y$  is cause for rejecting the hypothesis that the partial regression coefficients are estimates from the same population. See Lawrence Fisher "Determinants of Risk Premiums", Journal of Political Economy (1959, Chicago Press.) pp. 230.



## CHAPTER V

### SUMMARY AND CONCLUSIONS

Many of today's financial managers are facing the decision of whether to move the trading of their stocks to the Toronto Stock Exchange from the over-the-counter market or to continue to allow trading over-the-counter. In 1968 and 1969, approximately 130 companies decided to list their stocks on the T.S.E. It is assumed that they did this to benefit the company in some way.

Until now, there has been no research done on the T.S.E. to determine whether or not listing is beneficial to a company. As a result today's managers have little or no information to aid them in a decision as to whether or not listing is beneficial.

In recent years, studies have shown that listing does not have a significant effect on price on the New York Stock Exchange. This project's research attempted to retest this hypothesis in the context of the Toronto Stock Exchange.<sup>1</sup>

This study was intended to achieve two goals. First, it was an attempt to improve upon the stock evaluation model used by Richard Furst in his study of stocks listing on the NYSE. Furst's results were weakened because his multiple coefficient of determination indicated that only 27% of the variation was accounted for. It was ex-



pected that the evaluation model used in this research would be able to account for a greater percentage of the variation and thus improve on the results.

Second, this study was applied to a Canadian exchange to determine if the results would be different from those of the United States exchanges. For the purpose of this study, a sample of 54 companies listing on the T.S.E. in 1968 and 1969 was chosen. In all cases the companies were chosen because of the availability of data.

The possibility of biases in the study is recognized since only 54 out of a total of 139 newly listed companies were in our sample. Because of lack of data some biases may have been introduced due to the omission of a group of companies for which neither pre-listing price or financial data was unavailable. Unfortunately, it is impossible to calculate and account for this bias.

Two methods were used to test the effect of listing. First, regression equations of pre-listing and post-listing values of stocks were obtained to see how the shareholder evaluated assorted variables to determine the stock's price. These two equations were tested by various tests to determine if they were significantly different.

Second, a zero-one dummy variable was used in constructing a regression equation to test the effect of listing by combining both pre- and post- listing data in a regression equation. The dummy variable was in essence measuring the



effect of listing. This variable was then tested for significance.

### Major Conclusion

The most important conclusion which can be drawn from this study is that listing does not have a significant systematic measurable effect on the price of a stock. This does not mean that listing a stock on the T.S.E. will not be beneficial. Listing is no assurance that the price of a stock will be higher after listing than if the stock had remained on the over-the-counter market.

### Pre- and Post- Listing Coincidence

It is important to determine if stockholders evaluate stocks in the same manner in the over-the-counter market and on the T.S.E. To determine how stockholders evaluate stocks in both markets, pre- listing and post-listing equations were constructed. Three tests were used to determine whether the stocks were evaluated in the same manner both before and after listing. The F-test was used to determine if the equations were coincident; and z test was used on the multiple coefficients of determination to determine if they had changed significantly; and Fisher's test was used to determine if the individual independent variables had changed significantly. All three tests concluded that both equations were coincident. That is, stocks in both markets were evaluated in the same manner, reinforcing the conclusion that listing had no significant



effect on the stocks.

#### Limitations of the Study

The greatest limitation in this study was the research model. The coefficient of determination, although superior to Furst's still leaves much of the variation unexplained. This indicates that all factors influencing price are not included in the model. Unfortunately, there are some variables which stockholders may value highly but which are extremely difficult to quantify. Two examples are the quality of management and the industry in which the company is dealing.

In addition, with the large variety of companies and industries in the sample, the coefficient of determination will be lower. The companies were from various industries where the variables in the model would be evaluated differently and thus have different importance to shareholders. One way to attempt to increase the coefficient of determination would be to divide the sample into smaller industry groups. Since the sample was small initially, this was not attempted.

There are also inherent limitations in using a zero-one dummy variable as the listing variable. In using a 0-1 dummy variable it is very difficult to ascertain that it is accounting for the listing effect only and no other effect. This is especially true when considering the low coefficient of determination.



### Conclusions

In summary, this research has been valuable in two ways. First, it is the initial attempt to study the effect of listing on a Canadian stock exchange. Second, the evaluation model appears to be an improvement over Furst's previous model. Environmental factors were incorporated into the model by using a price index, a new institutional variable was added, and most of the other variables were calculated differently.



## FOOTNOTES

## CHAPTER V

1. Although the research was not done on the NYSE, the concept of listing on the NYSE & TSE is basically the same. Accordingly earlier research and conclusions on the concept of listing are strengthened.



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APPENDIX A

List of Companies in sample and

	date listed	1968
J. D. Carrier Shoe Co. Ltd.		March 20
Na-Churo International Ltd.		April 17
Aimco Industries Ltd.		May 6
Mindustrial Corp. Ltd.		May 14
Leigh Instruments Ltd.		May 30
Donlee Manufacturing Industries		July 3
General Distributors Ltd.		July 2
Galt Malleable Iron Ltd.		July 26
Scintrex Ltd.		July 29
A.G.F. Management Ltd.		Aug 19
Koffler Stores Ltd.		Sept. 11
Cara Operations Ltd.		Nov. 8
Rileys Datashare International Ltd.		Nov. 18
Cambridge Leaseholds Ltd.		Nov. 22
Skyline Hotels Ltd.		Dec. 16
Aquitaine Co. of Canada Ltd.		Dec. 31
Toromont Industrial Holdings Ltd.		Dec. 31
		1969
Commonwealth Holiday Inns of Canada		Feb. 7
Cadillac Development Corp. Ltd.		Feb. 10
Computel Systems Ltd.		Feb. 13
Acres Ltd.		March 12
Ensign Oil Ltd.		March 14
S. B. McLaughan Assoc.		March 21
Indal Canada Ltd.		March 24
Four Seasons Hotels Ltd.		March 27
Douglas Leaseholds Ltd.		March 27
West Coast Production Co. Ltd.		April 2
Cummings Properties Ltd.		April 18
Gesco Distributing Ltd.		April 18
Richard Costain (Canada) Ltd.		April 21
Campeau Corp. Ltd.		April 23
J. M. Schneider Ltd.		April 30
Agatec Industries Ltd.		May 2
J. Harris & Sons Ltd.		May 14
Bombardier Ltd.		May 15
Realty Capital Corp. Ltd.		May 28
Surpass Chemicals Ltd.		June 10
Villacentres Ltd.		June 12
Intermetco Ltd.		June 20
Shaw Pipe Industries Ltd.		June 27
D. N. Howden & Co. Ltd.		July 3
Irwin Toys Ltd.		July 11
Dominion Citrus Co. Ltd.		July 15



## APPENDIX A (Continued)

Penningtons Stores Ltd.	July 17
Glendale Mobile Homes Ltd.	July 18
Y & R Properties Ltd.	July 29
Orlando Realty Corp. Ltd.,	Aug. 11
Laidlaw Motorways Ltd.	Sept. 8
Automatic Hardware Ltd.	Sept. 15
Allarco Developments Ltd.	Sept. 16
Logistic Corp.	Sept. 24
Abel-Black Corp. Ltd.	Oct. 1
Beaver Engineering Ltd.	Dec. 5
Budd Automotive Co. of Canada	Dec. 9

















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